

1. (Currently Amended) An offshore system for petroleum production, comprising:

a buoyant hull;

a tendon assembly cooperatively engaged with the hull;

a counterweight at a lower end of the tendon assembly and suspended above the sea floor by the tendon assembly to provide tension to the tendon assembly;

an anchor member embedded in a sea floor and having an upper end protruding above the sea floor; and

an engaging member at the lower end of the tendon assembly that telescopingly engages the upper end of the anchor member to restrict lateral movement of the hull and accommodate heave of the hull.

2. (Original) The system according to claim 1, wherein the upper end of the anchor member and the engaging member are tubular.

3. (Currently Amended) ~~The system according to claim 1,~~ An offshore system for petroleum production, comprising:

a buoyant hull;

a tendon assembly cooperatively engaged with the hull;

a counterweight at a lower end of the tendon assembly to provide tension to the tendon assembly,

an anchor member embedded in a sea floor and having an upper end protruding above the sea floor;

an engaging member at the lower end of the tendon assembly that telescopingly engages the upper end of the anchor member to restrict lateral movement of the hull and accommodate heave of the hull; and

wherein the upper end of the anchor member and the engaging member define a chamber that varies in volume as the tendon assembly moves up and down due to heave of the hull, the chamber having a port to draw in and expel sea water to dampen the up and down motion of the tendon assembly.

4. (Original) The system according to claim 3, further comprising a check valve in the port that provides a greater flow area for the egress of sea water during downward movement of the engaging member than a flow area for the ingress of sea water during upward movement of the engaging member.

5. (Original) The system according to claim 1, wherein the upper end of the anchor member and the engaging member define a chamber that varies in volume as the tendon assembly moves up and down due to heave of the hull; and wherein the system further comprises:
a port in the chamber to draw in and expel sea water to dampen the up and down motion of the engaging member; and
an adjustable valve over the port for adjusting a flow area through the port.

6. (Original) The system according to claim 1, further comprising a plurality of internal risers, each having a separate axis, the internal risers being located in the tendon assembly and extending to the hull for transporting petroleum products between the hull and the sea floor.

7. (Original) The system according to claim 1, further comprising :

a plurality of flowlines adapted to be coupled to well equipment on the sea floor and extending to the counterweight; and

a plurality of internal risers joined to upper ends of the flowlines at the counterweight and extending through the tendon assembly to the hull, each of the internal risers having a separate axis.

8. (Original) The system according to claim 1, further comprising at least one external riser extending alongside the tendon assembly to the hull, the external riser adapted to be connected to a subsea wellhead at the sea floor.

9. (Original) The system according to claim 1, further comprising an anti-rotation device between the engaging member and the upper end of the anchor member for preventing rotation of the engaging member relative to the anchor member.

10. (Original) The system according to claim 1, further comprising a plurality of external risers, each of the external risers adapted to be connected to a subsea wellhead at the sea floor, at least some of the external risers engaging the counterweight to prevent rotation of the counterweight relative to the anchor member.

11. (Original) The system according to claim 1, wherein the upper end of the tendon assembly is cylindrical, and the system further comprises:

a cylindrical receptacle in the hull that receives an upper end of the tendon assembly, the receptacle having a plurality of circumferentially spaced lugs;
a plurality of keys spaced around the upper end of the tendon assembly for engaging the lugs;
and
the tendon assembly secures to the receptacle by relative rotation between the tendon assembly and the receptacle until the keys engage the lugs.

12. (Original) The system according to claim 1, wherein the anchor member comprises a tubular piling, and the engaging member comprises a sleeve that slides over the piling.

13. (Original) The system according to claim 1, wherein the anchor member comprises a caisson, and the engaging member comprises a piston member that locates within the caisson.

14. (Original) The system according to claim 1, wherein the tendon assembly comprises:
an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and the system further comprises:
an upper weight secured to a lower end of the upper riser section.

15. (Original) The system according to claim 1, wherein the tendon assembly comprises:
an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and wherein the system further comprises:

a shoulder in a lower end of the upper riser section for supporting an upper end of the lower tendon section; and

a hanger on an upper end of the lower tendon section for landing on the shoulder, the lower tendon section being run through the upper riser section.

16. (Original) The system according to claim 1, wherein the tendon assembly comprises:

an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and wherein the system further comprises:

an upper weight at a lower end of the upper riser section; and

a top connector on the upper weight for securing an upper end of the lower tendon section, the upper end of the lower tendon section having a separate axis from an axis of the upper riser section.

17. (Original) The system according to claim 1, wherein the tendon assembly comprises:

an upper riser section extending downward from the hull and a plurality of lower tendons extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than any of the lower tendons; and wherein the system further comprises:

an upper weight at a lower end of the upper riser section; and

a plurality of top connectors on the upper weight, each securing an upper end of one of the lower tendons to the upper riser section.

18. – 45. (Cancelled)

46 (New) An offshore system for petroleum production, comprising:

a buoyant hull;

a tendon assembly having an upper end secured to the hull for movement with the hull in response to waves and current;

a subsea counterweight at a lower end of the tendon assembly and above the sea floor to provide tension to the tendon assembly, the counterweight being movable in unison with the lower end of the tendon assembly;

an anchor member embedded in a sea floor and having a submerged upper end protruding above the sea floor; and

a submerged engaging member at the lower end of the tendon assembly that telescopingly engages the upper end of the anchor member to restrict lateral movement of the hull and moves up and down relative to the anchor member in response to movement of the hull due to waves and current.

47. (New) The system according to claim 46, wherein the upper end of the anchor member and the engaging member define a chamber that varies in volume as the tendon assembly moves up and down relative to the anchor member, and wherein the system further comprises a port in the chamber for ingress and egress of sea water.

48. (New) The system according to claim 47, further comprising:

a valve mounted to the port for selectively adjusting a flow area of the port.

49. (New) The system according to claim 47, further comprising a check valve that provides a greater flow area for the egress of sea water from the port of the chamber during downward movement of the engaging member than a flow area for the ingress of sea water during upward movement of the engaging member.

50. (New) The system according to claim 46, further comprising a plurality of internal risers, each having a separate axis, the internal risers being located in the tendon assembly and extending to the hull for transporting petroleum products between the hull and equipment on the sea floor.

51. (New) The system according to claim 46, further comprising an anti-rotation member between the anchor member and the counterweight for preventing rotation of the tendon assembly relative to the anchor member.

52. (New) The system according to claim 46, further comprising :
a plurality of flowlines adapted to be coupled to well equipment on the sea floor and extending to the counterweight; and
a plurality of internal risers joined to upper ends of the flowlines at the counterweight and extending through the tendon assembly to the hull, each of the internal risers having a separate axis.

53. (New) The system according to claim 46, further comprising a plurality of external risers extending alongside the tendon assembly, each of the external risers adapted to be connected to a

subsea wellhead at the sea floor, at least one of the external risers extending through a passage provided in the counterweight so as to prevent rotation of the counterweight relative to the piling.

54. (New) The system according to claim 46, wherein the upper end of the tendon assembly is cylindrical and the system further comprises:

a cylindrical receptacle in the hull that receives an upper end of the tendon assembly, the receptacle having a plurality of circumferentially spaced lugs;

a plurality of keys spaced around the upper end of the tendon assembly for engaging the lugs;

and

the tendon assembly secures to the receptacle by relative rotation between the tendon assembly and the receptacle until the keys engage the lugs.

55. (New) The system according to claim 46, wherein the tendon assembly comprises:

an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and the system further comprises:

an upper weight secured to a lower end of the upper riser section.

56. (New) The system according to claim 46, wherein the tendon assembly comprises:

an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and wherein the system further comprises:

an upper weight at a lower end of the upper riser section;

a shoulder in the lower end of the upper riser section; and
a hanger on an upper end of the lower tendon section for landing on the shoulder, the lower tendon section being run through the upper riser section.

57. (New) The system according to claim 46, wherein the tendon assembly comprises:
an upper riser section extending downward from the hull and a lower tendon section extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than the lower tendon section; and wherein the system further comprises:
an upper weight at a lower end of the upper riser section; and
a top connector on the upper weight for securing an upper end of the lower tendon section, the upper end of the lower tendon section having a separate axis from an axis of the upper riser section.

58. (New) The system according to claim 46, wherein the tendon assembly comprises:
an upper riser section extending downward from the hull and a plurality of spaced apart, parallel lower tendons extending downward from the upper riser section, the upper riser section being larger in diameter and shorter in length than any of the lower tendons; and wherein the system further comprises:
an upper weight at a lower end of the upper riser section; and
a plurality of top connectors on the upper weight, each top connector securing an upper end of one of the lower tendons.